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Test 1145: Kubota L225 Diesel 8-Speed

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NEBRASKA TRACTOR TEST 1145 – KUBOTA L225 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Hp	Crankshaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—576 rpm)								
20.86	2700	1.578	0.523	13.22	209	64	75	29.203
Standard Power Take-off Speed (540 rpm)—One Hour								
20.59	2534	1.499	0.504	13.74	208	66	75	29.200
Standard Power Take-off Speed (1000 rpm)—One Hour								
19.96	2363	1.401	0.485	14.25	212	61	74	28.850
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
18.17	2767	1.371	0.522	13.25	195	67	76	.....
0.00	2906	0.464	.....	.....	178	67	76	.....
9.37	2855	0.880	0.650	10.64	183	68	77	.....
21.18	2701	1.592	0.520	13.30	208	69	77	.....
4.74	2887	0.646	0.943	7.34	178	70	79	.....
13.89	2821	1.106	0.551	12.56	186	71	78	.....
Av 11.23	**2823**	**1.010**	**0.622**	**11.12**	**188**	**69**	**77**	**29.187**

DRAWBAR PERFORMANCE

Hp	Drawbar pull lbs	Speed miles per hr	Crankshaft speed rpm	Fuel Consumption Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cooling med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—6th Gear (2-H)											
16.06	944	6.38	2700	6.96	1.500	0.646	10.71	208	72	85	28.600
75% of Pull at Maximum Power—Ten Hours—6th Gear (2-H)											
14.07	793	6.65	2780	5.74	1.305	0.641	10.78	184	55	55	28.810
50% of Pull at Maximum Power—Two Hours—6th Gear (2-H)											
10.65	587	6.80	2811	4.70	1.138	0.739	9.36	183	68	71	28.720
50% of Pull at Reduced Engine Speed—Two Hours—7th Gear (3-H)											
11.39	626	6.82	2018	4.48	0.922	0.560	12.36	186	71	78	28.660
MAXIMUM POWER WITH BALLAST											
12.55	2015	2.34	2795	14.73	4th Gear (4-L)			185	53	60	28.520
16.97	1477	4.31	2701	10.52	5th Gear (1-H)			190	53	60	28.480
17.69	1047	6.34	2701	7.51	6th Gear (2-H)			184	58	60	28.810
16.61	688	9.05	2699	5.26	7th Gear (3-H)			187	55	62	28.490

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 6th Gear (2-H)

Pounds Pull	1047	1077	1079	1052	1104	1103	1033
Horsepower	17.69	16.35	14.52	12.33	11.01	9.09	6.90
Crankshaft Speed rpm	2701	2434	2156	1879	1606	1332	1072
Miles Per Hour	6.34	5.69	5.05	4.39	3.74	3.09	2.50
Slip of Drivers %	7.51	7.88	7.88	7.88	8.24	8.69	8.06

TRACTOR SOUND LEVEL	dB(A)
Maximum Available Power 2 Hours	93.5
75% of Pull at Max. Power 10 Hours	93.0
50% of Pull at Max. Power 2 Hours	91.5
50% of Pull at Reduced Engine Speed 2 Hours	90.0
Bystander 8th Gear (4-H)	80.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi	Two 11.2-24;4;14	Two 11.2-24;4;14
Ballast	—Liquid	235 lb each	None
	Cast Iron	348 lb each	None
Front Tires	—No., size, ply & psi	Two 4.00-15;4;42	Two 4.00-15;4;42
Ballast	—Liquid	None	None
	Cast Iron	146 lb each	None
Height of drawbar		21 inches	21½ inches
Static weight of operator	—rear	2380 lb	1215 lb
	front	1072 lb	780 lb
	total	3452 lb	1995 lb

Department of Agricultural Engineering

Dates of Test: October 2 to October 12, 1973

Manufacturer: KUBOTA LTD., OSAKA, JAPAN

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No** 50.1 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8308 **Weight per gallon** 6.917 lb **Oil SAE** 30 **API service classification** CC-SC **To motor** 1.395 gal **Drained from motor** 0.966 gal **Transmission and final drive lubricant SAE** 80 **Total time engine was operated** 51 hours.

ENGINE Make Kubota **Type** three cylinder vertical **Serial No** D1100-A-1374 **Crankshaft Mounted** lengthwise **Rated rpm** 2700 **Bore and stroke** 3.0″ x 3.23″ **Displacement** 68 cu in **Compression ratio** 21 to 1 **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** replaceable treated paper element with cyclone type precleaner **Oil filter** steel net and replaceable treated paper screw on cartridge **Fuel filter** replaceable treated paper screw on cartridge **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** L225-10358 **Tread width** rear 39⅜″ to 54⅛″ front 38⅝″ to 52⅜″ **Wheel base** 60¼″ **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 25¼″ Vertical distance above roadway 26½″ Horizontal distance from center of rear wheel tread 0″ to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.1 second 1.5 third 2.2 fourth 2.7 fifth 4.9 sixth 7.0 seventh 9.7 eighth 13.1 reverse 2.0 and 9.0 **Clutch** single plate dry disc operated by foot pedal **Brakes** internal expanding shoes operated by two foot pedals that can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 93″ left 93″ (on concrete surface without brake right 103″ left 103″ **Turning space diameter** (on concrete surface with brake applied) right 194″ left 194″ (on concrete surface without brake) right 214″ left 214″ **Power take-off** 540 rpm at 2534 engine rpm or 1000 rpm at 2363 engine rpm.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure.

First, second, and third gears were not run as it was necessary to limit the pull in 4th gear to avoid excessive slippage.

Eighth gear was not run as test procedure requires only one travel speed over 8 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1145.**

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
H. W. Ottoson, Director & Acting Dean; Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 4 different runs as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe limit for the test course. The manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska 68503.**

KUBOTA L225 DIESEL